

OBSERVATIONS
IN THE
MILITARY HOSPITALS
OF
DRESDEN.

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OBSERVATIONS

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MILITARY HOSPITALS OF DRESDEN.

HAVING had the opportunity of spending a brief holiday in the Military Hospitals of Dresden, I think it may not be without interest to the profession if I record a few observations made in connexion with one of the most remarkable struggles ever witnessed in Europe.

I reached Dresden on July 16th—that is, thirteen days after the battle of Kœniggrætz or Sadowa, and remained there till August 1st. My time was therefore very limited, and my observation of many cases incomplete.

Immediately on my application I received an appointment in the wards of one of the largest temporary lazarettes in the new town—the Cadetten-Haus, under the direction of Staff-Surgeons Drs. Knorr and Kohnhorn; and I gladly take this opportunity of expressing my grateful acknowledgements to them, and to the assistant-surgeons both of this institution and of the Garrison Hospital, for the courteous manner in which they assisted me during my stay. At their request, I subsequently made the post-mortem examinations of the more interesting fatal cases which occurred in the two hospitals—an arrangement which afforded a much better oppor-

tunity of examining the effects of gunshot injury than could have been obtained in the wards.

War has lost some of its attendant horrors, although the actual contests of our day are fiercer and more bloody than in any previous age. The Prussian authorities deserve all praise for their humane treatment of the wounded prisoners; they treated them exactly as they treated their own men. No difference existed in the care bestowed on Prussians, Austrians, or Saxons; they were wounded, and that was sufficient to secure attention and kindness from all parties. Patients of various nationalities lay indiscriminately in adjacent beds; and in many instances a great friendship seemed to have arisen between men who a few days before had been doing their utmost to bring one another to the helpless condition in which they then were. On one occasion a Prussian soldier, complaining that an Austrian prisoner had received more attention than he had, was sharply reprimanded for grounding his complaint on the difference of nationality. The Prussian people, however, justly complain of the utter insufficiency of the Austrian arrangements for the care of the wounded, which has necessarily thrown the entire burthen on them, and proportionately lessened the resources available for their own men. When we hear of a Bohemian hospital containing 700 severe cases from the battle-field, with only sixteen surgeons to attend to them, we may form some idea of the horrors of the camp: but worse than this, men lay for days upon the field before they were found, without getting so much as a drink of water. One young Saxon soldier, who had received a gunshot

fracture of the femur, lay for nearly fifty hours on the field before he was found ; he then received some wine and water, and had to be conveyed a distance of many miles before his wound could be attended to. As might be expected, he died from exhaustion in a few days. A patient in the Cadetten-Haus had lain for five days in a wood before receiving any further assistance than a little water and a piece of bread, given him by a passing comrade.

There were some dark stories afloat respecting the desertion of the wounded by the Austrian surgeons. In many of these cases doubtless the military authorities were chiefly in fault ; but in others it is to be feared that such conduct was the result of cowardice, or of a total disregard for the lives of the Italian, Croatian, and other non-German soldiers under their care.

The nursing was chiefly conducted by sisters of charity, some from Dresden, others from Westphalia and the Rhine provinces. They were assisted by volunteer nurses from various parts. Visitors also attended daily, bringing various little luxuries for the wounded—as flowers, newspapers, cigars, &c. ; whilst others came to write letters for those patients who could not do so themselves, or to act as interpreters for the numerous Hungarians, Italians, and Bohemians, who otherwise would have been unable to communicate their wants to their attendants. Some of the most melancholy cases were those of the Croats, who spoke a language utterly unintelligible to all present. One poor fellow died in the hospital without being able to communicate with anyone.

I may mention here that on the death of any patient, his effects were carefully collected by an officer appointed for the purpose, and divided into two parts—"property of the Kaiser," and "property of the individual." The former was of course forfeited to the Prussian government; the latter was, however, packed up, labeled with the owner's name, regiment, and a few other particulars, and as soon as peace is concluded will be sent to the Austrian government, in order that it may be returned to the friends of the deceased.

At Dresden the supplies of everything requisite for the treatment, and even to some extent for the comfort, of the wounded, were amply sufficient; and the general arrangements were very good, considering the enormous strain thrown upon the executive. The chief evils resulted from the unavoidable overcrowding, as is usually the case in military hospitals; these evils, however, were of a very serious nature.

In the temporary hospital to which I happened to be attached there is a large and lofty hall with windows on both sides; it is ordinarily the gymnasium of the cadet school. In this room were arranged four rows of beds, two deep on each side. The distance between the adjacent beds was only about two feet, and between the two rows of beds about three feet. Along the centre of the room was a broad gangway, measuring I think about ten feet in width. The room was so lofty, and the ventilation by means of open windows was so complete, that the air was, as a rule, very good; the cubic space allowed for each patient being, however, chiefly above him,

and not sufficiently around him, a very unhygienic condition was produced, which resulted in a serious outbreak of pyæmia and erysipelas. In the many small rooms adjacent to the large hall the beds were often placed at somewhat greater distances from one another, two and a half or even three feet being allowed; but as these rooms had but one row of windows, the air was generally not so good as in the large hall.

I may mention here, that the "Turn Halle," or gymnastic halls, to be met with in every German town, afforded excellent hospital accommodation, as they are generally spacious, and better ventilated than any other buildings in Germany. I visited a temporary hospital in the "Turn Halle" at Leipzig: the beds were very close together, and there were at least five rows of them on the ground-floor, and another row in the gallery all round the room; yet the air was as fresh as could have been wished, the windows being large and numerous on opposite sides of the room.

That this overcrowding in the case of gunshot injuries, where excessive suppuration necessarily ensues, is productive of fearful evils, cannot be doubted; and I think the authorities would have done well to have disregarded a few hours more railway travelling, and have distributed the slighter cases throughout the towns of North Germany, and have thus relieved the hospitals nearer the seat of war. An attempt was made to institute a tent hospital or "zeltstation" in connexion with the garrison hospital. I was informed by one of the medical officers connected with it that it did not answer as well as was expected;

for in consequence of the frequent and heavy rain, the tenting became so damp and impervious to the wind, that the air was actually worse in the tent than in the ordinary wards. These stations were subsequently built of wooden boards, loosely jointed, and roofed with tarpauling. These would, doubtless, act better than the others. A fatal mistake was, however, made in the use for which these tent stations were reserved. Only the severe cases of pyæmia and erysipelas were lodged there; so that removal to the tent station became almost synonymous with death. It is undoubtedly very desirable to separate those patients who have already got pyæmia from the neighbourhood of others who are still free from it; but as this was never effected with anything like completeness, it seems to me that it would have been far better to have conveyed all the cases newly operated upon directly to an uncrowded tent, apart from all chances of contamination, and thus have not only given them a better chance, but also have relieved the main hospital from a number of large suppurating wounds.

The town and hospitals were remarkably free from other epidemics. A few cases of cholera occurred, but these were chiefly imported from the North German towns by the soldiers; fortunately it took no hold in Dresden, thanks to its naturally healthy situation and to the rapid stream of the Elbe, which carries off the sewage in a most complete manner. No cases of typhus, and but few of typhoid fever occurred. As far as I am aware there was but one case of hospital gangrene during my stay in Dresden.

Pyæmia was, however, the scourge of the hospital. Of all the post-mortem examinations I had the opportunity of making, there were but few in which the patients were found to be non-pyæmic. The majority presented most typical and most terrible examples of metastatic abscesses in lungs or liver, more frequently in the former than in the latter; but when they did occur in the latter organ they generally attained a far greater magnitude. In one case the entire organ was completely riddled with abscesses. These sometimes appeared to follow the branches of the portal vein, presenting on section a remarkably arborescent appearance; the suppurating lobules had in such cases a dark spot in the centre. Abscesses appeared with almost equal frequency in the two lungs; most frequently in the posterior bases, and possibly more often in the right than the left lung. The position of these abscesses was marked on the surface by an indurated and elevated mass, surrounded by a ring of hæmorrhagic effusion. In some cases it would seem as if suppuration had subsequently taken place, outside this ring; thus there was an outer zone of greyish green pus, then a zone apparently of dark altered blood, enclosing the ordinary metastatic abscess or slough. An abscess was once found in one of the papillary muscles of the left ventricle of the heart. They were rarely found in the spleen, and not once in the kidneys. Some of the bodies of patients, who had died of pyæmia and diffuse cellulitis, presented horrible and ghastly pictures of extreme emaciation combined with sloughing so extensive, that in one instance the entire fleshy substance of the thigh

was converted into a huge abscess, containing a grey shreddy mass bathed in the most foetid pus. Decomposition advanced so rapidly in these cases that even when the post-mortem was made whilst the body was still warm, the blood in the liver and other organs was found to be aerated and loaded with gas-bubbles.

With respect to the domestic arrangements a few words must suffice. The bedsteads were of the simplest construction of wood or iron. The mattresses consisted of a large sack slit up the middle and stuffed with straw. They were rough and hard; but it was surprising how very few bed-sores were produced thereby—a result due probably to the youth and naturally healthy constitution of the men. The ordinary diet consisted of coffee and bread in the morning; a bowl of soup, with meat and vegetables, for dinner; soup and bread, or eggs, for supper; beer or red wine in very moderate quantities. Few things surprised me more than the small quantities of stimulants given by the German surgeons. Even in cases of profuse suppuration, low forms of erysipelas, pyæmia, &c., they give no brandy, and only moderate quantities of red wine (claret). This seemed to me to be a fatal error; and several cases would, I feel assured, have done better under a more actively stimulating treatment. Even with the enlightened views of the German school of pathology, there is still much of the old prejudice with respect to the nature of inflammation.

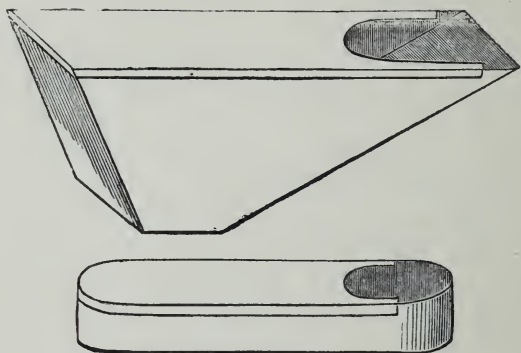
The irrigators employed in washing out the wounds, and especially the long sinuses left by the tracks of the bullets, are of great value.

They consist simply of a tin vessel with an aperture near the bottom, to which is attached an india-rubber tube with a bone nozzle. By means of this contrivance a continuous stream can be made to play over the wound, and thus effectually wash out the sinuses, &c., without the use of sponges. I regret to say that the latter were, however, in far too constant use; and as servants can never be got to attend to precautionary measures, these sponges were frequently carried from patient to patient, necessarily often loaded with the very poison of pyæmia. I cannot but attribute much of the very serious pyæmic epidemic from which we suffered to the want of sufficient caution in small matters of this nature.

The plaster-of-Paris bandage was the only form of stiff apparatus employed in the treatment of fractures and injuries of joints. It is, I think, inferior to the starch bandage, both in durability and comfort. The plaster is liable to crack, and to be weakest at the very points where most strength is needed; it is, moreover, difficult to remove, and cannot be easily tightened as the limb shrinks. It has, however, some great advantages in the eyes of military surgeons in the rapidity with which it becomes firm, and in the readiness with which it may be applied.

A mode of treatment lately adopted very generally in German hospitals had an extensive trial at Dresden. I refer to the practice of keeping limbs, the subject of acute inflammation, in water-baths for long periods. These baths are made of sheet-zinc, and are of various shapes suited to receive the fore-arm, leg, &c., (see fig.)

FIG. 1.

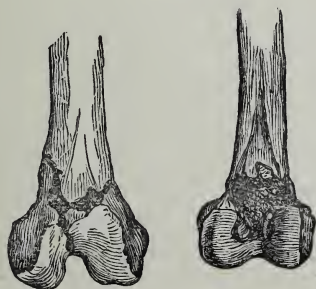


The limb rests upon slings stretched across the bath; the water is employed warm, and can easily be renewed from time to time. This mode of treatment appeared to be of some value in cases of phlegmonous erysipelas. I have occasionally seen all redness, hardness, and pain leave a part in less than twenty-four hours under the influence of the water-bath. It was also extensively employed in cases of wounds of the foot and hand, where several joints, tendons, &c., were implicated. The objections to the method are, that the soft parts become extremely sodden, and the granulations around the margin of the wound exceedingly flabby and prominent. The former objection might be obviated by frequently oiling the skin of the part immersed; this would in some measure prevent the absorption of water by the cuticle. The patients seemed to derive much comfort from the use of the bath in cases of injury of the foot, and it seemed to be effectual in preventing suppuration from extending along

the sheaths of the tendons. Another plan adopted in cases in which it was required to apply hot fomentations to a limb, where a joint was injured or a bone fractured, consisted in placing the limb in a wirework trough padded and lined with macintosh, so that the fomentation cloths were effectually covered and protected at the same time that the limb was supported almost as well as if an ordinary splint had been applied. This appeared to give excellent results.

There was ample opportunity in Dresden of observing the effects of the different bullets employed by the three armies, Prussian, Austrian, and Saxon; and after a careful examination of a very considerable number of cases, I cannot agree with the opinion which I find generally entertained in this country, that the bullet of the Prussian needle-gun produces a *less* serious wound than that of the Austrian Minie rifle. I have before me a preparation of the lower end of the left femur, in which the condyles have been completely separated from the shaft by a Prussian bullet, and which presents a good example of what it is capable of effecting.

FIG. 2.



In this case the ball entered in front and to the inner side, and passed out behind and to the outer side, carrying away with it a large quantity of small fragments. A more complete destruction of the bone could hardly have been produced by a single bullet. I have another preparation of gunshot fracture of the humerus, in which at least two inches of the bone had been carried away by a Prussian bullet, and lodged under the skin on the inner part of the arm. As the effects produced by different forms of firearms are now creating some interest, it may be worth while to dwell on this subject more fully. The three forms of bullet employed in the late war are represented in the annexed figures, of their natural size.

FIG. 3.



The Austrian bullet is somewhat the largest and heaviest of the three; it is a simple conical bullet, with two deeply cut rings near the base, and with a moderately deep depression in the base of the cone. The Saxon bullet is the smallest, and somewhat the lightest of the three; but the difference between its weight and that of the Prussian bullet is inconsiderable; it weighs 452 grs. It forms a truncated cone, the apex being

cut off; it is also characterized by a shallow ring on its surface, and a deep but narrow pit at the base.

The Prussian bullet, the most interesting of the three, is not simply conical, but might rather be described as consisting of two cones, one of which is truncated, united together at their bases. It is perfectly smooth, being marked by no rings or pits. A small knob is often left where it has been cut off from the mould. It weighs 486 grs, and is a trifle lighter than our English Enfield bullet.

In estimating the effects produced by these various bullets, it must be remembered that the Prussian soldiers never fire at long ranges, seldom beyond 150 yards; whilst the Austrians and Saxons frequently fire at over 300 yards range. The Prussian bullets, therefore, struck the enemy whilst retaining a high velocity, and produced proportionately serious effects. Many wounds were, indeed, received at very close quarters, the needle-gun enabling the Prussians to fire at a distance of six feet from the enemy—an advantage which rendered the bayonet an almost useless weapon. An instance of this was mentioned by one of the Austrians; and the account was generally believed to be substantially true. A brigade of Austrians, numbering about 1000 men, charged a body of Prussians in an open plain. There was just sufficient distance to enable the men to employ a bayonet charge to the greatest advantage. The Prussians, however, fired with such rapidity without bringing their rifles to the shoulder that when the Austrians came within six feet of them there was only the

last company—about sixty-five men—remaining. These were so staggered by their fearful loss that they all threw down their arms, and gave themselves up as prisoners.

The difference in the effect produced is more observable in the change of form the bullet itself undergoes, than in the injury it causes. The peculiarity in the action of the Prussian bullet appears to result from the fact that, instead of its apex coming in contact with the bone &c., it usually strikes somewhat obliquely, and, if it have not sufficient impetus to enable it to pass out on the opposite side, it is found irregularly flattened from side to side, and retaining no trace of its original form; whilst the conical Minie bullets, impinging directly upon their apices, are generally flattened in a direction from before backwards, and almost invariably retain some of their characteristic marks. Fig. 4 represents a very fair specimen of a Prussian bullet after having struck against a bone. It was removed after death from the midst of a number of small fragments of the humerus, against which it had struck.

FIG. 4.



I have seen Austrian and Saxon bullets retain-

ing their form almost unchanged, after doing great execution in the long bones; but I have never seen a Prussian bullet, which had struck a bone, remaining unaltered in shape.

A short account of a case noticed in the Wards may prove interesting as illustrating some of these points; it is as follows:—A Prussian soldier standing with his left leg advanced was shot by an Austrian; the bullet passed through the calf of this leg, and penetrated the Tibia of the right one producing a cleanly cut hole, which readily admitted the tip of the forefinger; there was absolutely no splintering of the bone around it. The bullet was found lying immediately beneath the skin, and was successfully removed by Dr. Von Kranz, the patient doing remarkably well, the man was very proud of his bullet, which was but slightly damaged in spite of what it had accomplished. He was a very plucky fellow, and related with great satisfaction how he had not only shot his enemy after receiving the wound, but had actually crawled up to him and taken his ramrod as a trophy: a little incident, which shews how close the combatants were to one another, and accounts for the unusual form of fracture. I have presented to the Museum of University College a preparation, exhibiting a gunshot fracture of the upper end of the Tibia, which in some respects resembles the above; here however the knee joint was implicated.

There were many large lacerated flesh wounds produced by splinters of shells, &c.; but these, as a rule, presented but little of interest. Dr. Knorr successfully removed a portion of grenade shell, measuring one inch and a half in two directions,

and a quarter of inch in thickness, from the superior maxilla of a Prussian soldier; but this was, I believe, the only case of the kind in the hospital during my visit.

The search after bullets and their extraction was a source of the greatest interest both to surgeons and patients. It often proved a matter of the greatest difficulty to determine whether a bullet was lodged in the body or not; frequently the men would assert positively that the ball had been extracted on the field, when it subsequently proved not to have been the case. The excitement produced in some men by the sight of the bullet was most astonishing. An Italian seized his bullet, bit it violently, and cursed it so furiously that it had to be taken from him to prevent him injuring himself. A Prussian soldier, apparently by no means an excitable fellow, on seeing the ball which had been removed from his thigh, burst into tears, and shaking hands with us all round, divided his attention between blessing us and cursing his bullet. The men always kept them as valuable relics, and would not have parted with them at any price. The "Garidaldi sonde," as it is called after the illustrious hero for whose case M. Nélaton invented it, proved of the greatest service. I have known a bullet, buried at a depth of four inches in the fleshy part of the thigh, recognised by the faint streak of lead left on the unglazed porcelain at the end of the probe. By its aid it was easy to determine between a piece of fractured bone and a bullet. Of the instruments used for extraction, the ordinary bullet-screw and long forceps were perhaps the two most commonly employed; but the new

American bullet-forceps was very highly spoken of. Its peculiarity consists in the sharply serrated blades crossing one another, and not simply meeting. Fragments of all shapes were easily removed by this instrument.

FIG. 5.



The above figure represents somewhat imperfectly the form of the original. The anterior part of the lower blade is intended to lie in a plane nearer the spectator than the similar part of the upper blade; whilst in the posterior half the upper blade is the more superficial of the two; so that the two blades cross one another.

With regard to the apertures of entry and exit, there was, as a rule, very little difference to be observed between them; they were often of the same size, and presented very much the same characters. I frequently observed that the supposed aperture of exit healed more rapidly than the other. The account of the patient could rarely be trusted; and I found the holes in the clothing to be the best guides, as here the aperture of exit was invariably the larger and more irregular of the two. In one case, in which a bullet had penetrated both thighs, it was only by examining the trousers that we could determine the direction it had taken, the patient's account proving incorrect.

As might be expected from the nature of the firearms employed and the shortness of the range, but few instances occurred of bullets having been turned by a rib or other bone; I had however, an opportunity of seeing three cases in which the bullets had tunnelled under the skin for a consi-

derable distance after striking against a rib, and another in which the ball had passed round the Humerus instead of penetrating it, severe periostitis ensuing. Instances of very narrow escapes were to be found in the Wards: in one case a bullet had passed for two inches through the abdominal wall between the skin and the peritoneum without wounding the latter in the least; there was no peritonitis, and the patient was doing well. On one occasion a Prussian was lying on the ground whilst skirmishing, when a bullet struck him immediately above the clavicle just external to the line of the subclavian artery; instead however of penetrating the chest, as might have been anticipated, it passed under the bone, and having struck against the tip of the coracoid process escaped through the skin, thus making a most curious passage. As an example of multiple wounds I have already instanced a case in which the bullet had passed through both thighs, producing necessarily four openings; in another patient the bullet had penetrated the upper part of both thighs and the intervening scrotum, and in another it had passed through both buttocks. One poor fellow had received four distinct wounds, viz. compound fractures of the lower jaw, and forearm, and flesh wounds in the thigh and leg. Another man was reported to have received as many as six distinct bullet wounds.

Judging from the number of cases of hopelessly bad fractures that were sent to Dresden from the field hospitals, there must either have been a great want of operative assistance on the spot, or the most unbounded faith in the reparative powers

of nature. I have had the opportunity of dissecting very many cases of extensive comminution of the bones of the elbow, knee, &c., in which one would have thought that no surgeon could have entertained the faintest hope of saving the limb. Primary operations are so universally recognised by military surgeons as superior to secondary operations, that their non-performance was probably solely due to the enormous strain thrown upon the exertions of the surgical staff on the field. The circular method was most generally adopted in preference to the flap, in consequence of a belief that the latter exposes the patient to a greater risk of pyæmic infection from the magnitude of the wound. In cases where, from the nature of the injury, the flap operation became necessary, the single long flap was generally preferred.

Resections were seldom performed; in fact, I only saw one of the elbow-joint. For although several cases must have afforded excellent opportunities for primary resection, yet at a later period the extensive suppuration, and disorganization of the soft parts, precluded all hope of a satisfactory result.

I obtained three specimens of gunshot fracture of the bones in the neighbourhood of the elbow-joint, which illustrate forcibly the need for primary resection in these cases; and I cannot call to mind any instance of fracture implicating this joint, which appeared likely to recover without operative assistance.

Of the other operations of conservative surgery we had but few examples. The only case of Pirogoff's amputation of the foot ended fatally

from profuse traumatic gangrene. In several cases, I think, Syme's amputation might have succeeded, but there was generally in these cases too much infiltration of the tissue of the heel to promise a favourable result, and amputation in the lower third of the leg was preferred.

Considering the number and variety of the wounds under treatment, secondary hæmorrhage was of unfrequent occurrence. Dr. Kœhnhorn ligatured the axillary and the femoral arteries for repeated hæmorrhage from wounds of the respective limbs; both cases were successful as far as the operation was concerned, but one of them (the femoral) became pyœmic when the wound was nearly closed. A case of ligature of the brachial resulted in amputation at the shoulder-joint, in consequence of severe secondary hæmorrhage at the seat of ligature; on examination, there was found to be a very small and incomplete clot in the artery.

In no case of hæmorrhage from the lung resulting from gunshot injury was it found necessary to employ venesection, digitalis generally proving efficient when combined with the ordinary astringents. One very interesting case occurred under the care of Dr. Mönnel, in which the patient, after spitting blood for fourteen days, recovered with the bullet remaining in his body; when he left the hospital he had only a very slight cough, and no pain.

Any statistical conclusions founded on observations made solely in the Hospitals of Dresden must necessarily have little or no value, because for the most part, cases of a certain degree of severity only were sent there, the more severe

being retained in Bohemia, and the lighter ones being sent on to more distant towns. I shall therefore forbear drawing any such conclusions from the results of my experience.

I propose to conclude this brief account with a few reports of some of the most interesting cases that occurred at the hospital.

CASE I.

(Under the care of Dr. Mænnel).—A Prussian struck in the root of the neck on the left side by a round ball from the bursting of a Saxon shrapnel or canister-shot; the ball measured about half an inch in diameter. On admission, the patient had much stiffness and pain on moving his neck, and kept his head inclined to the right side. He subsequently had pain in his back, dulness over his left lung, and extreme difficulty of breathing. It was believed that the ball had entered the thorax. He died with evident signs of pyæmia on July 21st, having received his wound on the 3rd.

Post-mortem examination.—The track of the ball was carefully examined, and it was found to have entered into the posterior triangular space of the neck a little anterior to the margin of the trapezius, to have passed thence behind the sternomastoid, behind and very close to the jugular vein, vagus nerve, and carotid artery to the sixth cervical vertebra, in the body of which it remained impacted. The posterior surface of the œsophagus had been almost grazed by the ball, and there was an abscess in the cellular tissue between it and the spine, running down to about

the second dorsal vertebra, and containing the remains of a blood-clot mixed with purulent fluid. Inflammation had extended through the intervertebral substance to the bodies of the fifth and seventh cervical vertebræ. The left lung presented the first stage of hepatization throughout its lower lobe, and the right lung was intensely congested. Both lungs presented numerous metastatic abscesses scattered over their surfaces, varying in size from that of a pin's head to that of a filbert; evidence of a slight recent pleurisy on the left side. Other organs normal. No abscesses in liver, spleen, or kidneys. In this case it is highly probable that the system became affected through the veins of the vertebræ, as the external wound was insignificant in size, and the abscess had not implicated any important structures. The patient had not been exposed to any special risk of pyæmic infection, as no cases had occurred in his immediate neighbourhood. Unfortunately a few days after he had exhibited unmistakable signs of pyæmia, two other patients in the adjacent beds became affected. The preparation of the vertebra is in the museum of University College.

CASE II.

(Under Dr. Brinkschulte).—A Prussian received, on July 3rd (Battle of Kœniggrætz), a wound in the left gluteal region in an oblique direction, from a Saxon bullet. He felt at the moment of being struck as if the whole of his leg below the knee had been carried off, suffering intense pain in this part. It was some time before he could

realise that he had not lost the greater part of his limb. He remained completely paralysed in the left lower extremity till his death on the 24th, which resulted from exhaustion and profuse supuration. Injury to the sciatic nerve was diagnosed.

Post-mortem examination.—The aperture of entry was situated at a spot in the left gluteal region corresponding to the level of the third sacral vertebra, and at about two inches and a half from the middle line. From this point the track of the bullet was traced in a direction obliquely outwards and downwards, and was found to pass through the outer quarter of the sciatic nerve, the whole thickness of which was much bruised and blackened. It then entered the neck of the femur through the whole length of which it passed, emerging at the posterior and outer part of the root of the great trochanter, where the bullet was found lying immediately under the integuments. (See Fig. 6.) On further examination it was found that the neck of the femur was com-

FIG. 6.



pletely split into two parts, an anterior and a posterior part; the former carrying the head, and

the latter, which was incomplete in consequence of the loss of some loose fragments, remaining attached to the shaft. In the sketch the posterior fragment has been turned outwards to exhibit the fractured surfaces, and some small fragments from the posterior surface near the head have been turned downwards. Inflammation had extended into the hip-joint, the head of the femur being completely denuded of cartilage, and the ligamentum teres grey, soft, and shreddy. There was extensive suppuration around, and a blackish-grey fetid matter was burrowing deeply amongst the muscles of the thigh.

The ball was but slightly altered in shape, appearing bruised on one side only. It must have been fired at a very short range, as the tissues in its track presented the appearance of having been burnt with a hot iron.

The preparation is in the museum of University College.*

CASE III.

An Austrian, shot in the back on the 3rd July, and died on the 25th. No clinical history was obtained.

Post-mortem examination. — The bullet entered the body of the fifth sacral vertebra, and wound-

* Since the above was written I have carefully examined the bone, and I have reason to believe that the above diagram and description of the course of the bullet are somewhat inaccurate. The ball, I believe, entered at the spot indicated, but escaped at the root of the small trochanter, and then passed round the shaft to the position in which it was found: this is, I think, proved by the appearance of the fractured bone; the result however was as represented in the figure.

ed the wall of the rectum in its passage towards the left side; here it struck and fractured the left innominate bone at a spot immediately external to the thyroid foramen, at the same time opening the hip-joint and bruising the head of the femur. From this point all trace of the bullet was lost; and as it certainly was not to be found even on careful search, it had probably fallen back into the pelvic cavity, and had escaped or been extracted through the aperture of entry. The cavity of the pelvis was filled with a dark grumous and very fetid fluid, mixed with broken-down blood-clots. An extensive effusion of blood had taken place under the peritoneum lining the pelvis, and under the serous coat of the sigmoid flexure of the large intestine. The left ischiatic and pubic bones were completely shattered, and numerous sharp fragments of bone were found lying loose in the cavity, whilst others projected into the muscles of the upper part of the thigh, where an abscess had formed. The hip-joint was completely disorganized, and the bones denuded of cartilage. The bladder was uninjured. The other viscera were not examined. This post-mortem was made on the floor under considerable difficulties.

CASE IV.

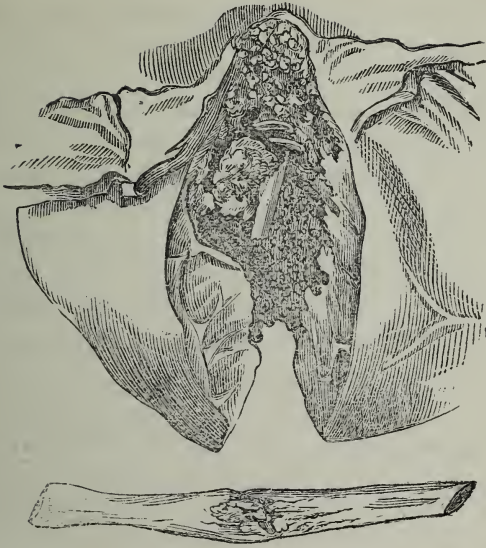
(Under Dr. Spitzner).—An Austrian, who received a bullet-wound on the 3rd July at a spot situate over the sixth rib, about two inches below and somewhat behind the right nipple. The patient died on the 25th, with symptoms of empyema and pneumothorax. He had had some

slight peritonitis, and for a few days had had a slight icteric tint in his conjunctiva, but this had passed off. No other symptoms referable to the liver had occurred.

Post-mortem examination.—On making an incision through the wound, it appeared as if it did not penetrate deeper than the subcutaneous tissue; the rib was not fractured, and no canal could be traced inwards. At one spot, however, the tissue of the intercostal space appeared as if it was not quite normal. On opening the chest air escaped freely; and the right pleural cavity was found to contain a large quantity—about a quart—of reddish puriform fluid. The lung was found to be collapsed, dense, and airless, lying compressed against the spine, and bound down by firm adhesions. The pleura itself was thickened, and covered with a grey shreddy lymph.

On examining the wall more carefully, a rough fragment was found projecting from the inner surface of the seventh rib, from which a piece seemed to have been torn off. The diaphragm came in close contact with the parietes at this spot, and a hole was found in it, through which the finger could be introduced into the liver. A probe could be passed through the whole thickness of the organ, and be withdrawn at the under surface, where a sharply-cut hole, measuring about half an inch in diameter, existed. The diaphragm was firmly united to the surface of the liver. On laryng open this canal, the condition represented in the annexed figure was found. (See Fig. 7, copied from a drawing made on the

FIG. 7.



spot.) The aperture of entry through the diaphragm measured three-quarters of an inch, and its edge presented the appearance of having been pushed inwards; that of the aperture of exit appearing, on the other hand, sharply-cut and somewhat everted. The canal itself had a fusiform outline, being much wider in the centre than at the extremities. It contained a considerable quantity of a thick grumous fluid, apparently consisting of altered blood, bile, and pus. The wall presented a very rugged appearance, being lined with loose portions of liver-substance, blood-clot, and with masses of biliary concretion exuding from the ends of the ducts. In the midst of these lay a fragment of bone, about an inch and a half long, exactly corresponding to the

piece missing from the rib. It had evidently been carried onwards by the bullet, and lodged in the liver-tissue. On tracing the canal further, it was found to pass behind the colon ascendens, through the fat surrounding the kidney, and even grazing the capsule of the lower part of that organ. From this point the track was not so distinct, an abscess having formed and burrowed downwards along the sheath of the psoas, as far as the iliac crest. The ball must, however, have struck the body of the first lumbar vertebra, as this was fractured and presented an indentation, with fissures radiating from it. Here probably its course was arrested, and after lying some time in this spot it must have fallen against the wall of the colon ascendens, and have ulcerated its way into the gut, and so have been discharged per anum, as, in spite of the most careful search throughout the whole abdominal cavity, no further trace of it could be found. The coats of the intestine around the orifice were thickened and united together; the edges of the orifice presented much more the appearance of ulceration than of direct penetration. There were some adhesions between several coils of intestine, and here and there between them and the wall. No purulent peritonitis existed, and no fæcal extravasation had taken place. The symptoms had been almost entirely referable to the chest. Nothing of note was found in the other organs.

The drawings and preparations are in the museum of University College.

CASE V.

An Austrian shot in the abdomen on the 3rd of July. At first he had some severe peritonitis, which passed off; later he became intensely yellow, and died pyæmic on the 27th.

Autopsy.—The external wound was completely closed, and covered with a dry scab; it was situated at a spot two inches to the right of, and two inches and a half below the umbilicus. On opening the abdomen, there was found to be evidence of some slight general peritonitis, and of a considerable amount localized in the right ilac fossa; here the caecum and the neighbouring part of the colon ascendens were bound to some coils of the small intestine by bands of lymph. At one spot the adhesions were firm, and appeared to be partly organized. On gently separating them, it was found that they served to close a hole leading into the colon at a point about an inch and a half above the ileo-caecal valve. Directly opposite to this hole was another, effectually closed by the adhesions formed between the gut and the wall of the pelvis; on removing the intestine, an indented fracture of the brim of the pelvis was found, situated immediately above the sciatic notch, and from which two deep fissures extended upwards and downwards. Considerable extravasation of blood had taken place beneath the peritoneum, and some clots of blood, apparently freshly formed, were found in the pelvic cavity. The bullet was found lying embedded in these clots, but not in any

way encysted; it was of course a Prussian bullet, and presented a distinct mark on its side where it struck against the bone. No fæcal extravasation had taken place.

CASE VI.

This case, although a suicidal one, and only indirectly connected with the war, presents so many points of interest that I venture to introduce it here. It illustrates well the results produced by the favourite mode of suicide in vogue at present amongst the Prussian soldiers.

A Prussian soldier of the 20th "Landwehr" regiment, a fine and very handsome man, shot himself through the eye in consequence of having received the melancholy tidings of the sudden death of his wife and three children from cholera whilst he was absent on duty in Dresden.

The ordinary method of suicide, which he adopted, is as follows:—The man loads his "zündnadelgewehr" in the usual way at the breech. He then drives down the barrel a small wad of cotton, pours water in until the barrel is about one-third full, and then drives in as far as the water a small cork or wad. Having prepared this enormous charge, this man must have looked down the barrel with his left eye, and pulled the trigger with his toe. Death must have been instantaneous; and at the post-mortem the following conditions were observed:—The face was burnt and blackened for rather more than an inch around the left orbit, and a little on the right side. The eyelids were but slightly destroyed, the edges only being burnt off. There

was a wound in the scalp over the superior posterior angle of the left parietal bone, where the bullet had passed out. On removing the scalp the entire left side of the calvaria was found to be completely smashed into small irregular fragments, varying for the most part in size from one to four square inches. The sutures were so much loosened that they could be separated without difficulty. Deep fissures in the bone extended across the base, through the ethmoid and sphenoid, and between the right parietal and occipital bones. The left cerebral hemisphere was simply a pulp of mingled brain substance, blood, and water. A large clot of blood extended into the right hemisphere, and down to the medulla and cerebellum. Such a remarkable comminution of the bones could only have been produced by the rending force of the water employed, as the bullet had evidently passed directly through the skull at the posterior superior angle of the left Parietal Bone, and could not have caused such extensive mischief. This Aperture of exit presents a very good illustration of the truth of Mr. Erichsen's statement, that the difference observed in fractures of the two tables of the Skull depends as much upon the direction of the force, as upon the anatomical structure of the tables themselves, and is also in accordance with the results of Mr. Teevan's experiments. The inner table in this case has been cleanly perforated by the bullet, the edges of the whole being sharp and well defined, whilst those of the outer table are bevelled off in a direction corresponding to the course of the ball, the aperture being thus almost funnel shaped.

The preparation of the vault of the Cranium is in the Museum of University College.

CASE VII.

An Austrian was wounded on the 3rd July over the left clavicle by a bullet, which had either been extracted, or had fallen out after striking the bone. The Clavicle was broken transversely about its middle; there was remarkably little comminution and no further wound of the Pleura. The patient died on 23rd July with symptoms of empyema, which led to the belief that the wound had penetrated the chest.

P.M. The Cavity of the left Pleura was completely filled with a thin, grumous and foetid pus and a large quantity of flaky lymph: on the most careful examination no wound of the Pleura could be discovered.

The left lung was found contracted, lying closely against the spine except in those parts, where it was attached to the parietes by some old adhesions. It was completely airless, except near the apex and anterior margin: the general substance was hard and dense. The right lung was very emphysematous and free from adhesions. There was extensive and active Pericarditis; the Heart being adherent to the Pericardium by numerous bands of recent lymph, affording a most characteristic specimen of the "*Cor Villosum*." Other organs normal: no pyæmic abscesses present.

No clinical history could be obtained in reference to the cause of the Pleurisy and Pericarditis; the latter was probably secondary to the former.

CASE VIII.

An Austrian received a gunshot wound of the arm on the 3rd July: he became intensely jaundiced and died pyæmic on the 23rd.

P.M. The bullet had entered in front and having passed directly through the Humerus escaped at the posterior surface.

The interest in this case consisted in the remarkably clean fracture of the Bone: it was a simple transverse fracture without any splintering upwards or downwards, and the fragments could be brought into direct apposition. The apertures of entry and exit were remarkably similar, from which we must suppose that the ball possessed a high velocity at the time it inflicted the wound. I saw no other instance of fracture produced by a Prussian bullet, in which there was so little laceration of the soft parts.

It was a case of all others, in which a successful result might have been anticipated from an attempt to save the limb, and it may advantageously be compared with the following.

I may mention that the examination was incomplete, in consequence of its being carried on in the presence of several soldiers on the floor of a large riding school.

CASE IX.

An Austrian died on the 26th July in consequence of a gunshot fracture of the Humerus received on the 3rd: during the course of treatment

several considerable fragments of bone were removed through the wound. An abscess formed under the Pectoralis major, and after it had been opened serious hæmorrhage took place into the Cavity. Death resulted apparently from pyæmia.

P.M. The bullet entered the limb on the outer side, and having struck the shaft of the Humerus about its middle fractured the bone, and carried off about two inches of its length in the form of small fragments. It had not however sufficient force to overcome the elasticity of the Skin, and was therefore found imbedded amongst the bony fragments immediately beneath the integuments, presenting the form represented in fig. 4.

The origin of the Abscess under the Pectoral was doubtful: I considered at the time that it was a result of a blow, or some other injury unconnected with the Bullet wound; I was however assured by the Attendant that it had formed apparently spontaneously whilst the patient was in the hospital. It was probably of pyæmic origin, as small metastatic abscess existed in the fibres of the Deltoid.

In such a case as this it is evidently hopeless to expect union, and with so much laceration of the soft parts amputation should have been performed on the field. The differences between this and the former case, the fractures being produced by similar bullets at similar parts of the bones, can only be explained by supposing a difference to have existed in the velocities of the projectiles.

The Preparation of the Humerus and the Bullet is in the Museum of Univ. Coll.

CASE X.

An Austrian, who had received a wound in the cheek and another in the Shoulder, died from pyæmia on the 30th July.

P.M. In the wound of the left Shoulder the bullet had entered just below the clavicle, and passing obliquely through the neck of the Scapula had carried off numerous fragments of bone into the neighbouring soft parts; it had also bruised the head of the Humerus, and had ultimately escaped through a wound situated behind and to the outer side of the shoulder. A vast clot of Blood was found in the Axilla and under the Deltoid, which appeared to have been of recent formation. The articulation was of course entirely destroyed as nothing remained to represent the glenoid cavity. Abscesses were found disseminated through both lungs, but were most marked in the right: some of them presented the unusual appearance described above, suppuration having taken place outside the ring of hæmorrhagic effusion, which was always present in these cases around the central slough, and which resulted I presume from the embolic obstruction of a vessel. The other organs tolerably healthy.

In the wound in the right cheek the bullet had entered at a spot corresponding to a portion of the jaws, where some teeth had been extracted, so that no fracture or injury of the jaws had been produced. The Bullet may have escaped through his mouth, and it is quite possible that the same bullet produced both injuries, as the man may have been inclining his head to the left side.

The Preparation of the Bones of the Shoulder Joint is in the Museum Univ. Coll.

CASE XI.

(Under Dr. Mænnel).—A Prussian shot in the back at the Battle of Gitschin progressed favourably for a considerable time; paralysis however commenced in the left leg, and gradually increased, until both lower limbs, then his bladder on the 21st, and lastly his arms on the 24th, became affected. The Bullet was believed to have been extracted on the field, as stated by the patient himself. He died on the 27th of July, exactly one month after the receipt of his wound.

P.M. The wound in the integuments was situated over the upper part of the left sacro-iliac articulation; some loose fragments of bone could be felt with the probe, but no further injury could be discovered.

On carefully dissecting in the neighbourhood of the wound a sinus was found to exist, extending downwards for a distance of about $\frac{3}{4}$ inch, and then opening into an abscess, which penetrated deeply along the side of the spine amongst the muscles, producing complete disorganisation of their tissues as far as the lower dorsal vertebræ. By the side of the spine of the last lumbar vertebræ lay the bullet, somewhat misshapen, but retaining evidence of its having been originally a round, and not a conical bullet, (probably a Saxon one).

On opening the Spinal canal, (not without some difficulty, the instrument case being unprovided with a suitable saw,) a large quantity of

pus was found lying between the Dura Mater and the Bone, and extending at least as high as the 9th or 10th Dorsal vertebræ. Some of this might certainly have entered into the canal during the process of opening it, but there must have been pus present during life, as numerous flakes of lymph with pus entangled in their substance were found covering the surface of the membrane. The Dura Mater in the lower part of the canal having been laid open, there was found to be injection of the sheaths of the nerves forming the "Cauda equina"; and in parts of them some curious transverse striae of a whitish colour were noticed by Dr. Maennel. The Cord itself appeared of good consistence, and the grey matter distinct: at one spot a shred of doubtful false membrane was removed from the meninges.

Lungs; the left presented numerous pyaemic abscesses of moderate size scattered over the surface: there were also some in the right lung, but here the most noteworthy object was an enormous Infarct in the posterior part of the lower lobe, measuring about $2\frac{1}{2} \times 2$ inches at the surface, and extending inwards in the form of a wedge to a depth of $1\frac{1}{2}$ inch. Beneath the pleura this was of a greenish yellow colour; but on section the interior presented the dark moroon colour of pulmonary apoplexy, surrounded by a reddish yellow border separating it from an area of intensely congested lung tissue.

Several other smaller Infarcts also existed.

Heart; a large discolourized clot completely filled the cavities of the right side. On the left side there was evidence of acute endocarditis on the surface of the mitral valve; small hæmorrhage-

gic spots and vascular thickening of its borders. In one of the papillary muscles a metastatic abscess, as large as a pea, was found. Pyaemic abscesses of moderate size were found in the liver; and an Infarct in the Spleen. The kidneys presented nothing worthy of note.

The Bladder was the subject of acute Inflammation: haemorrhage had taken place at various points beneath and into the substance of the mucous membrane; the intermediate parts being lined with a flaky, and imperfectly adherent false membrane of a pale greenish yellow colour.

The amount of injury done to the bone was unimportant.

In this interesting case there are several points worthy of attention: the gradual progress of the paralysis, due doubtless to the pressure produced by the collection of pus in the spinal canal; the absence of all spasm in the legs, in spite of the injection observed in the sheaths of the nerves in the Cauda equina; the extensive distribution of pyaemic abscesses; the enormous Infarct present in the lung; and lastly the metastatic abscess in the Heart, the only instance of the kind met with in this series of cases.

CASE XII.

Under Dr. Spitzner. An Austrian shot in the little finger of the left hand at Königgrätz; amputation of the finger was subsequently performed, and in consequence of severe secondary hæmorrhage, the terminal part of the Ulnar Artery was ligatured. The patient became somewhat icteric, but not markedly so, and had a

considerable amount of diarrhœa: hæmorrhagic spots appeared over the surface of his body. Death on the 26th July.

P.M. *Lungs*: the right lung was found to be slightly adherent to the chest wall over its entire surface, evidently the result of an old pleurisy. The base presented some hypostatic congestion, but not very marked: at the posterior part of the upper lobe there was a metastatic abscess having the usual characters, measuring about 1 square inch on surface and extending $\frac{3}{4}$ inch into the substance; hæmorrhage had taken place around. The left lung was free from adhesions, but presented several metastatic abscesses.

Heart: contained a decolourized clot; substance flabby.

Liver: upper surface adherent to diaphragm: on removal there was found to be an enormous abscess in the most prominent part of the right lobe, the superficial measurements being 4 inches from side to side and $2\frac{1}{2}$ from before backwards: when opened it was found to contain a large sloughy mass bathed in stinking pus; the wall of the cavity was lined with shreddy masses of broken down tissue. Scattered over the surfaces of both lobes were numerous irregular clusters of small abscesses, some united together, some separate: those on the under surface presented remarkable arborescent forms, in consequence of the lobules being affected along the lines of the branching portal canals; in the centre of each lobule was a dark spot caused by the congested branches of the Hepatic vein. Suppuration had evidently in this case taken place in the part supplied by branches of the portal vein or hepatic

artery, probably the latter, a point of some interest when considered in relation to the much vexed question of the origin of these deposits.

Spleen: a well defined Infarct existed at the surface of the ordinary form; and a circumscribed mass presenting many of the characters of an infarct was found occupying the centre of the organ.

Kidneys: presented evidence of old inflammatory changes, whilst some recent hyperæmia was present.

Intestines: congestion of the mucous membrane and scattered hæmorrhagic spots were found throughout the canal; the membrane presented an unusually soft appearance: Peyer's patches and the solitary glands were large, but presented no evidence of Typhoid condition.

The Parotid gland on the left side exhibited a remarkably fine example of recent acute inflammation: the lobules were distinctly mapped out by the enlarged and turgid vessels, the whole gland being much swollen, hard and tense. The patient had complained of pain and swelling in the region of the gland for 3 days previous to his death.

On examining the neighbourhood of the wound extensive extravasation of blood was found throughout the forearm, the wound was sloughy, and the entire palm of the hand was infiltrated with pus.

Amongst the many curious cases which occurred in the hospital, I may briefly notice two. First, a case of true senile gangrene, or mummification of the toes of both feet, occurring in a young Hungarian, probably under twenty-five

years of age (beardless, and only just cutting his wisdom teeth), who had received a flesh wound in the upper part of his left thigh. The wound did not implicate the vessels, and pulsation could be felt in the tibial arteries. There was no evidence of early degeneration, no arcus senilis, no calcification of the vessels, and no evidence of valvular disease of the heart; the heart's action was, however, feeble. No history of ergotism could be obtained. The gangrene commenced in the toes of the left foot, and extended to the sole, and then attacked the great, middle, and little toes of the right foot. A distinct line of separation had formed. The Patient's skin was hot and dry, his pulse feeble but frequent, and his general aspect dull and heavy. He appeared to suffer very considerable pain especially on movement.

The particulars of his case were obtained with difficulty through an interpreter, as the man did not speak German; he did not know what his age was exactly. Dr. Von Kranz, under whose care he was, will probably publish a full report of this interesting case.

Second, a case in which a bullet had entered by the side of the anus, and escaped at the extremity of the penis, passing through its whole length. The patient died three weeks after the receipt of the injury from infiltration of Urine. Unfortunately no post-mortem examination was made: it was believed however that the bullet had entered the Trigone of the Bladder.

Such is a brief outline of some of the more striking cases which occurred during my short stay at Dresden, and it will serve to indicate what a rich field there was for surgical observa-

tion, and for the study of those causes which add so largely to the fearful mortality of the battlefield. It is to be hoped that the Prussian Government will follow the example set by that of the United States, and issue as full and valuable a Report on the Surgery of the War.

APPENDIX.

NOTES ON THE SURGERY OF THE AMERICAN WAR.

It may prove of some interest to those, who have not had an opportunity of seeing the very valuable report of the Surgeon General of the United States army, if I give a brief abstract of some of the more important results deduced from the enormous mass of material afforded by the late war in America, and compare some of them with the observations detailed above. I may state that I had not seen the work referred to till after my return.

Of Gunshot injuries to the Head I saw but little and can therefore draw no comparisons.

In the American War the following results were obtained. Out of 704 fully reported cases of injury to the Skull or its contents, 505 died, and 199 recovered.

Trephing was performed in 107 cases, of which 60 died and 47 recovered.

Portions of bone and foreign bodies were removed in 114 cases, of which 61 died and 53 recovered.

The per-centage mortality after operative procedure was therefore 54·7.

In 483 cases treated by expectancy the mortality was 79·5 p. c.

The Report cautions us however against deciding in favour of operative procedure on these grounds, the statistics being incomplete.

Some interesting cases follow illustrating many important points in regard to diagnosis and treatment of cranial injuries viz., the uselessness of trephining for the purpose of evacuating pus between the Dura Mater and the Bone (Pott): cases of fracture of the inner table of the skull only; of remarkably slow developement of cerebral symptoms; of balls being split by

striking against the skull obliquely; of recovery after perforating wounds of the brain.

Of 18 cases of *Hernia Cerebri* following gunshot wound 4 recovered without interference; when bandaging and compression were resorted to coma rapidly supervened; and when the tumour was sliced off it was found to be speedily reproduced, death from irritation ensuing. The conclusion is decidedly in favour of expectant treatment and simple dressing.

The summary is as follows:—

1st. In the after-treatment of scalp wounds a multitude of surgeons did not consider antiphlogistic measures of essential importance.

2nd. In the treatment of Cranial fractures, the general tendency was to the practice recommended by Guthrie in regard to operative proceedings, rather than the more expectant plan insisted upon by the majority of modern European writers on military surgery.

In cases of injuries to the Face, the most common cause of death was secondary hæmorrhage; ligature of the Carotid postponed for a time the fatal result. The result of Plastic operations seems to have been satisfactory.

Injuries to the Spine were very fatal; out of 187 cases only 7 recovered, and of these 6 were fractures of the transverse and spinous processes; in the remaining case the canal was penetrated, and although it is stated that he is likely to recover, it is highly probable that some secondary mischief will develop itself in the spinal cord. A case is given in which the cord was divided at a level with the 8th dorsal vertebra, death ensuing on the 29th day.

I have recorded above two cases of gunshot injury to the spine, in both of which the causes of death was pyæmic infection, and in one of them suppuration had taken place in the canal producing progressive paralysis of the lower limbs. I think the special venous arrangement in the vertebræ tends to expose the patient in these cases to great risks of pyæmia.

Injuries of the chest; in 1272 fully reported cases of penetrating wound of the Thorax or of wound of the Viscera the percentage mortality was 73. The report states that Venesection was abandoned altogether in the treatment of Hæmorrhage from the Lung: cold applications, rest, and the administration of opium proving sufficient. This fact has received confirmation during the late war, (see above). Intercostal hæmorrhage was of very rare occurrence and proved to be quite a secondary

accident: in such cases complete closure of the wound for the purpose of causing compression, was followed by very fatal results.

The addition of fracture of the rib at the aperture of entry proved to be a very dangerous complication. Penetrating wounds with lodgment of the ball were more fatal than perforating wounds: of this there was ample proof. Very few recoveries are mentioned in the report, of cases in which the ball lodged in the body. (See above)

Injuries of Chest and Abdomen: under this head four cases of recovery are recorded.

In one of these the ball having penetrated the intestine was voided at stool, and in two of them the Liver was wounded, there being remarkably little peritonitis, and shock.

These points are well illustrated by case 4, the result however not being so fortunate.

Of the Abdomen 414 penetrating wounds are reported, the mortality being at the rate of 74 p. c. Some wonderful cases of recovery are given; amongst the chief points of interest may be noticed, the escape of three *Ascarides lumbricoides* through a wound in the small intestine from which a thin fluid without faecal odour was discharged, no motion being passed for 29 days; a bullet was voided, at stool 14 hours after penetration of the gut, probably the transverse colon judging from the position of the wound.

It is stated that recoveries after wounds of the large intestine were much more numerous than after those of the Ileum or Jejunum. Sutures do not seem to have been required in any case.

Wounds of the Liver were generally rapidly fatal from extravasation and peritonitis; out of 32 cases, 4 however recovered.

Wounds of the Spleen were all fatal. Doubtful cases of recovery are reported after wounds of the Pancreas and Kidney.

Ventral Hernia seems to have resulted in two cases from laceration of the abdominal wall and protrusion of the Intestine—Portions of omentum were excised with apparent advantage.

Penetrating wounds of the Abdomen complicated with injury to the spine uniformly proved fatal: a case is reported to which Case 4 bears a striking resemblance.

Fractures of the Pelvis; of 359 cases, 97 recovered, 77 died,

and the result in the remaining 185 is unknown. In most cases there was very tedious suppuration, and but little could be done except to allow the escape of pus and remove portions of dead bone. Stromeier's observation was verified, with regard to the liability to Pyæmia in these cases.

Of the Genito-Urinary organs 457 uncomplicated cases are reported, of which 37 proved fatal. In one case a ball remained encysted in the corpora cavernosa without causing pain. Wounds of those portions of the Bladder uncovered by peritoneum not unfrequently recovered; the others proved fatal. A fragment of a grenade shell measuring 2 inches in length, 7-8ths inch in width, and 3-8ths inch in thickness and encrusted with phosphatic deposits, was removed from the bladder of a man, where it had remained for upwards of 9 months.

Gunshot wounds of the Upper Extremity give a gross total of 21,248.

The statistics are however very incomplete: of 1689 terminated cases there were 1253 recoveries, and 436 deaths.

Amputation or Excision in 996 cases gave a mortality of 21 p. c.

Conservative treatment in 693 cases gave a mortality of 30 p. c.

Gunshot wounds of the Lower extremity give a gross total of 30,014 there being 4862 fractures, and 25,152 flesh wounds.

A valuable statistical table is given in the report of which the following are the most important items:—

The only recorded recoveries after gunshot fracture of the femur involving the Hip Joint were those in which Excision was practised, the mortality rate being 83·33 p. c.

In gunshot fracture of the Upper Third, the highest mortality rate occurred in cases, in which amputation was practised, viz. 75 p. c.: excision afforded slightly better results, viz. 72 p. c., (amongst the 7 cases of recovery, in two the head and upper part of the shaft of the Femur were removed, in four the ends of the bone were sawn off, and in one, fragments and sharp points of bone only were removed): under conservative treatment a large number (93) of cases were successfully treated, the per centage of deaths being 71·81.

In wounds of the knee joint the mortality was high after amputation, viz. 73·23, but excision proved less successful, the rate being 90 p. c.: whilst conservative treatment gave 83·76 p. c.; but in this latter class many cases of recovery are included, in which there was some doubt as to the fact of the joint having been wounded.

“Comparing in gross the 822 finished cases treated by amputation, with the 1117 treated by conservation the mortality rate of the former has the advantage by 8 p. c. ; an advantage that is maintained in the different regions, except in the upper third. It must be remembered that the amputations include most of the bad cases, and those in which preservation of the limb was attempted and abandoned.”

The Statistics relating to fractures of the Tibia and Fibula are incomplete, the mortality is reported as about 24 p. c.

When describing the effects produced by bullets on the long bones the Report contains the following remark: “In Strome-
yer’s classification of the action of bullets on bone, the fifth division is that in which the ball pierces the bone and forms a canal without causing further splintering. Examples are common in the upper portion of the Tibia, but very rare in the upper extremity of the femur.” Cases then follow in which this occurred in the upper and lower ends of the femur; that of the former is however not very satisfactory as considerable injury appears to have been done. A very good example of this variety of fracture in the Tibia is detailed above.

As is generally admitted, conical bullets produce greater longitudinal splintering than round ones, and experience has shewn that it is possible to operate at a point nearer to the seat of injury in the latter than in the former case.

The report also draws attention to a very curious effect produced by a bullet striking the end of a bone and producing a simple transverse fracture at a point considerably above the primary injury; thus if the bullet produced a compound comminuted fracture of the Condyles of the Femur a simple transverse fracture might be found situated about the middle of the shaft, the two fractures being quite distinct. It appears that these injuries were produced by balls fired at short range.

When a bone was simply contused and the periosteum stripped off, a limited necrosis resulted which not unfrequently terminated in inflammation in the Medullary cavity and in Pyæmic infection.

Many interesting illustrations are given of the amount and kind of union which took place in bones during certain periods, varying from 10 weeks to 9 months.

Primary and uncomplicated wounds of large vessels rarely come into Hospitals, as they are very rapidly fatal. Only 27 such cases are reported out of a total of 36,508 gunshot wounds. The report however considers that primary hæmorrhage on the battle field is of much less importance than is usually believed.

The Reports on wounds of Nerves are not given, but many observations have been made and will be published subsequently.

Very few Sabre and Bayonet wounds were received, only 105 cases of the former, and 143 cases of the latter being reported during the first three years of the war. The public seem to entertain very erroneous notions with regard to the effects produced by the latter weapon; it adds but little to the mortality of the battle field; the results produced in former wars have depended probably more upon its moral than its physical influence, and can hardly be counted on in these days of breach loaders and superior education amongst soldiers.

Only 363 cases of traumatic Tetanus were reported during the war, a comparatively small number considering the enormous number of wounds received. Of these 336 ended fatally, the recoveries being chiefly chronic or subacute cases; four very severe cases recovered, of which two were treated with opium, and two by amputation of the injured part. All the various methods of treatment suggested for this terrible disease had a fair trial, and the result is summed up as follows,—in the acute form no treatment appears to be of any use and in the milder form almost any treatment is successful.

The Post-Mortem results were of a very negative character; congestion of the Brain and Spinal cord was frequently noticed.

The causes most potent in producing the disease were sudden changes of Temperature, unextracted bullets and other foreign bodies confined under fasciæ, and service in the southern states.

Secondary Hæmorrhage: the records relating to this important subject are incomplete, nevertheless 1037 cases are reported.

Of these, 387 were cases of Hæmorrhage from Stumps, 60 per cent proving fatal.

And 650 of Hæmorrhage from wounds, 51 per cent proving fatal.

The Femoral Artery was ligatured for hæmorrhage from Stumps 93 times, for hæmorrhage from Wounds 45 times.

The Subclavian, was ligatured after amputation at the Shoulder Joint 5 times, and for wound in the Axilla 6 times.

The Common Carotid, for wound of deep branches of internal Carotid 15 times.

Amputation was practised for hæmorrhage from wounds 78 times, and for hæmorrhage from Stumps 14 times.

The ligature was generally applied as near as was prudent to the end of the stump, and in a few cases on the face of the stump. Distal ligature (Anel's method) gave bad results.

The necessity of applying the ligature at the seat of injury in primary hæmorrhage was clearly shewn.

Pyæmia supervened in 377 cases of gunshot injury in which no operation was performed, and in 295 cases of amputations, of which 155 were cases of amputation in the continuity of the Femur; it occurred in 27 cases of excision in the shafts of long bones and in 28 excisions of joints.

"These figures by no means represent the frequency with which pyæmic poisoning has occurred. It has been one of the great sources of mortality after amputations and its victims are to be counted by thousands." Statistics proved the inutility of the Sulphites and Hyposulphites as therapeutic agents in this disease.

The remainder of the report is occupied with a discussion on Surgical Operations, which cannot be abbreviated with advantage, and with questions relating to the management and sanitary conditions of Military Hospitals into which space will not allow me to enter.

